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## IP220A-x 12-Bit D/A, Analog Output

The IP220A outputs analog voltage signals to drive up to 16 devices. When used with a carrier that holds four IP modules, up to 64 voltage outputs can be obtained from a single card cage slot.

Each output channel has its own 12-bit D/A converter (DAC). Individual DACs are faster, and they eliminate glitches typically caused by the re-acquisition process of sample and holds found on multiplexed output boards.

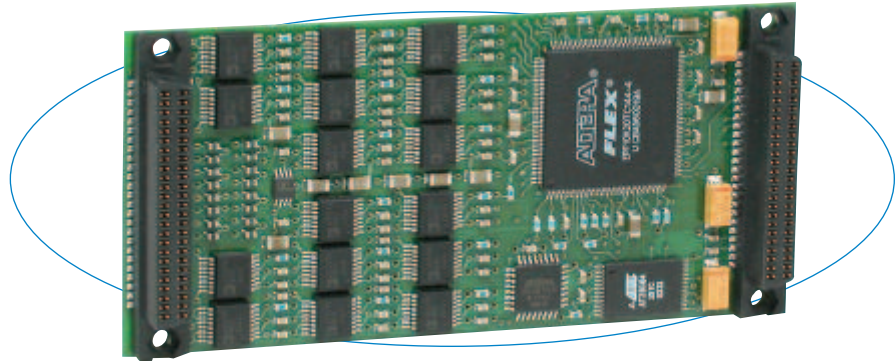
Individual channels also have double-buffered data latches. You can select to update each output when it is written to, or to update all outputs simultaneously. Simultaneous outputs better simulate linear movements in motion processes.

### Features

- 8 or 16 analog voltage output channels
- Independent 12-bit D/A converters per channel with an 11.0µs settling time
- Bipolar voltage (non-isolated) outputs: -10 to +10 volts
- Double-buffered DACs
- High load capability (5mA output current)
- Built-in calibration coefficients

### Benefits

- Outputs reset to 0 volts.
- Internally stored calibration coefficients ensure accuracy.
- Software provides easy selection of transparent or simultaneous output modes.
- Double-buffered DACs allow new data to be written to each channel before the simultaneous trigger updates the outputs.



The IP220A features individual D/A converters on each channel for better performance.

### Specifications

#### Analog Outputs

Output configuration: 8 or 16 single-ended.  
 D/A Resolution: 12 bits.  
 Output range: Bipolar, -10 to +10V.  
 Settling time: 11µs.  
 Maximum throughput rate:  
 Outputs can be updated simultaneously or individually.  
 One channel: 11µs/conversion.  
 Sixteen channels simultaneously: 17µs/16 channels.  
 System accuracy: 0.025% of 20V span maximum corrected error (i.e. calibrated) at 25°C with the output unloaded.  
 Data format (left-justified): Bipolar Offset Binary.  
 Output at reset: 0 volts.  
 Output current: -2 to +2mA (maximum). This corresponds to a minimum load resistance of 5K ohms with a 10V output.  
 Short circuit protection: Indefinite at 25°C.

#### IP Compliance (ANSI/VITA 4)

Meets IP specifications per ANSI/VITA 4-1995.

IP data transfer cycle types supported:

Input/output (IOSel\*): DAC data, control registers, DAC offset and gain calibration coefficients.  
 ID read (IDSel\*): 32 x 8 ID PROM.

Access Times (8MHz clock):

ID EEPROM read: 0 wait states (250nS cycle).  
 DAC channel data write: 1 wait states (375nS cycle).  
 DAC offset/gain coeff. read: 1 wait states (375nS cycle).  
 Control register access: 1 wait states (375nS cycle).

#### Environmental

Operating temperature: 0 to 70°C (IP220-8/16) or -40 to 85°C (IP220-8E/16E models).  
 Storage temperature: -55 to 100°C (all models).  
 Relative humidity: 5 to 95% non-condensing  
 MTBF: 4,094,686 hrs. at 25°C, MIL-HDBK-217F, notice 2  
 Power: +5V: 33mA typical, 45mA Maximum  
 +12V from P1: 150mA typical, 200mA maximum.  
 -12V from P1: 133mA typical, 180mA maximum.

### Ordering Information

#### Industry Pack Modules

- IP220A-8**  
Eight voltage outputs
- IP220A-8E**  
Same as IP220A-8 plus extended temperature range.
- 5089-8**  
Same as IP220A-8 except requires the use of external ±15V supply
- 5089-8E**  
Same as IP220A-8E except requires the use of external ±15V supply
- IP220A-16**  
Sixteen voltage outputs
- IP220A-16E**  
Same as IP220A-16 plus extended temperature range.
- 5089-16**  
Same as IP220A-16 except requires the use of external ±15V supply
- 5089-16E**  
Same as IP220A-16E except requires the use of external ±15V supply

Acromag offers a wide selection of [Industry Pack Carrier Cards](#).

#### Software (see [software documentation](#) for details)

##### IPSW-API-VXW

VxWorks® software support package

##### IPSW-API-QNX

QNX® software support package

##### IPSW-API-WIN

Windows® DLL driver software support package

##### IPSW-LINUX

Linux® support (website download only)

See [accessories documentation](#) for additional information.

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